This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) Process for coproduction of high purity paraxylene and styrene, starting from a feedstock containing xylenes, ethylbenzene and C9-C10 hydrocarbons, the process comprising the following successive steps:

– A feedstock distillation step (1), making it possible to separate xylenes, performed in a distillation column (2), from which is withdrawn, at the head, a stream (3) comprising most of the metaxylene, paraxylene, ethylbenzene and at least part of the orthoxylene, and from which is withdrawn, at the bottom, a stream (4) containing C9-C10 hydrocarbons, the remaining part is orthoxylene.

– An adsorption step for head stream (3) in at least a first adsorption column (6) operating as a simulated moving bed and containing numerous adsorbent beds, preferably interconnected in a closed loop, and having a different selectivity for paraxylene, ethylbenzene, metaxylene, and orthoxylene, said column comprising at least four operating zones: a zone 1 for desorption of paraxylene located between the injection point of a desorbent (5) and the removal point of an extract (7a), a zone 2 for desorption of ethylbenzene, orthoxylene and metaxylene located between the removal point of extract (7a) and the injection point of adsorption feedstock (3), a zone 3 for adsorption of paraxylene, located between the injection point of adsorption feedstock (3) and withdrawal of a refined product (7b) and a zone 4, located between the withdrawal point of refined product (7b) and the injection point of desorbent (5).

- A step for distillation of extract (7a), performed in at least one distillation column (8a), from which is withdrawn pure paraxylene (9a), preferably pure to at least 99.7% by weight, on

the one hand, and on the other hand desorbent, which is then recycled, at least in part, in the first adsorption column.

- A step for distillation of refined product (7b) in at least one distillation column (8b) from which is withdrawn, on the one hand, desorbent that is recycled at least in part in the first adsorption column is withdrawn from the column, and, on the other hand, a distilled refined product (9b) containing metaxylene, orthoxylene, and ethylbenzene.

- A step of dehydrogenation of the distilled refined product consisting of ethylbenzene to obtain an effluent containing styrene, metaxylene, orthoxylene, unconverted ethylbenzene and by-products, performed in at least one dehydrogenation zone (10), during which at least 50% by weight of the ethylbenzene introduced is converted into styrene.

– At least one step of eliminating the by-products in at least one distillation column, to produce a mixture (18) containing mostly styrene, ethylbenzene, metaxylene, and orthoxylene.

– A step of separating mixture (18), in which a first stream (23a) containing styrene with a purity of at least 99.8% by weight is produced and a second stream (23b) containing mostly metaxylene and orthoxylene is produced.

- An isomerization step, in a unit (24), of second stream (23b), preferably in liquid phase, in at least one isomerization zone, at the end of which paraxylene (25), orthoxylene, and metaxylene are recovered and are recycled upstream from feedstock distillation column (2).

2. (Original) Process according to claim 1, wherein the step of separating mixture (18) is performed in at least a second adsorption column (20) operating as a simulated moving bed, containing numerous beds of an adsorbent, preferably interconnected in a closed loop and having different selectivity for styrene, ethylbenzene, metaxylene, and orthoxylene, said column (20)

comprising at least four chromatographic zones: a first zone, for desorption of styrene, located between the injection point of a desorbent (19) and that of the removal of an extract (21a); a second zone, for desorption of ethylbenzene, metaxylene, and orthoxylene, located between the point where extract (21a) is removed and where an adsorption feedstock comprising said mixture (18) is injected; a third zone, for adsorption of styrene, located between the injection point of feedstock (18) and that of the withdrawal of a refined product (21b), and a fourth zone located between the point of withdrawal of refined product (21b) and that of injection of desorbent (19).

3. (Currently Amended) Process according to ~~one of claims 1 to 2~~ claim 1, wherein the extract is distilled to eliminate desorbent from it, the refined product is distilled to eliminate desorbent from it, and the recovered desorbent is recycled at least in part to the second adsorption column.

4. (Currently Amended) Process according to ~~any one of claims 1 to 3~~ claim 1, wherein first adsorption column (6) is operated in five operating zones, a first refined product (7b), enriched with ethylbenzene, is withdrawn from this column and a second refined product (7c) is withdrawn between the withdrawal point of first refined product (7b) and the injection point of desorbent (5), said adsorption column (6) being then characterized in that it comprises: said operating zones 1 and 2 of first adsorption column (6), a zone 3A for adsorption of paraxylene, located between the feedstock injection point and the withdrawal point of the first refined product, a zone 3B for adsorption of ethylbenzene, located between the withdrawal point of the first refined product and the withdrawal point of the second refined product, a zone 4 located between the withdrawal point of the second refined product and the desorbent injection point.

5. (Original) Process according to claim 4, wherein first refined product (7b) is distilled in

a distillation column (8b) to eliminate from it essentially all the desorbent, first distilled refined product (9b) being then conveyed to dehydrogenation zone (10), and second refined product (7c) being then distilled in a distillation column (8c) to eliminate from it essentially all the desorbent, second distilled refined product (9c), which is recovered essentially free of ethylbenzene, being then directed toward the isomerization zone.

6. (Currently Amended) Process according to ~~one of claims 1 to 5~~ claim 1, wherein the adsorbent used in the first adsorption column is an X zeolite exchanged at barium, or a Y zeolite exchanged at potassium, or a Y zeolite exchanged at barium and potassium.

7. (Currently Amended) Process according to ~~any one of claims 2 to 6~~ claim 2 in which the adsorbent used in the second adsorption column is an X or Y zeolite exchanged at sodium or barium or potassium or lithium as well as at potassium and silver.

8. (Currently Amended) Process according to ~~one of claims 1 to 7~~ claim 1, wherein the desorbent of the first adsorption column is selected from the group formed by paradiethylbenzene, toluene, paradifluorobenzene and diethylbenzenes in mixture.

9. (Currently Amended) Process according to ~~any one of claims 2 to 8~~ claim 2, wherein the desorbent of the second adsorption column is selected from the group formed by toluene, naphthalene, and its alkylated derivatives.

10. (Currently Amended) Process according to ~~one of claims 2 to 9~~ claim 2, wherein the volumetric ratio of desorbent to feedstock for the first adsorption column is between 0.5 and 2.5, preferably between 1.4 and 1.7, and the volumetric ratio of desorbent to feedstock for the second adsorption column by adsorption is between 0.5 and 3.0, preferably between 1.4 and 2.0.

11. (Currently Amended) Process according to ~~one of claims 1 to 10~~ claim 1, wherein the

first adsorption step is performed at a temperature between 20°C and 250°C, preferably between 90°C and 210°C, and still more preferably between 160°C and 200°C, and under a pressure between the boiling pressure of xylenes at the operating temperature and 2 MPa.

12. (Currently Amended) Process according to ~~one of claims 2 to 11~~ claim 2, wherein the second adsorption column is operated at a temperature between 20°C and 200°C, preferably between 50°C and 150°C, and still more preferably between 60°C and 100°C, and under a pressure between the boiling pressure of the mixture at the operating temperature and 2 MPa.

13. (Currently Amended) Process according to ~~one of claims 4 to 12~~ claim 4, wherein the first adsorption column contains at least 24 beds, at least 3 of which are in zone 3B.

14. (Currently Amended) Process according to ~~one of claims 2 to 13~~ claim 2, wherein the second adsorption column contains at least 16 beds, at least 5 of which are in the second zone.

15. (Currently Amended) Process according to ~~one of claims 1 to 14~~ claim 1, wherein fraction (9a) is enriched with paraxylene, to at least 50% by weight of purity, and is conveyed to at least one crystallization zone to deliver paraxylene crystals and a mother liquor, the crystals are separated from the mother liquor, optionally resuspended, washed, and recovered, and the mother liquor is recycled in the first separation column.

16. (Currently Amended) Process according to ~~one of claims 1 to 15~~ claim 1, wherein distillation column (2) is operated so that at least part of a fraction containing orthoxylene is withdrawn at the bottom of the column, said fraction further containing aromatics with at least 9 carbon atoms is conveyed to a distillation column so that an orthoxylene stream with a purity of at least 98.5% by weight is withdrawn at the head and a stream containing aromatics with at least 9 carbon atoms and possibly orthoxylene is withdrawn at the bottom.

17. (Original) Process according to claim 1, wherein the separation step of mixture (18) uses a separation technique selected from the group formed by distillation, azeotropic distillation, extractive distillation, liquid-liquid extraction, chemical complex formation, membrane separation, and their combination.

18. (Currently Amended) Process according to ~~one of claims 1 to 17~~ claim 1, wherein second stream (23b) further contains styrene, this stream is hydrogenated in a hydrogenation zone, and a hydrogenation effluent is recovered and conveyed to the isomerization zone.

19. (Currently Amended) Process according to ~~one of claims 1 to 18~~ claim 1, wherein second stream (23b) contains at most 10% by weight of ethylbenzene and preferably at most 5% by weight of ethylbenzene.